

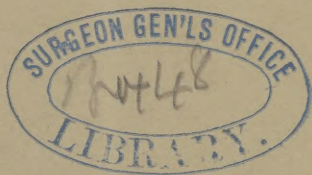
WHITE (O. A.)

REPORT
UPON
YELLOW FEVER

AS IT APPEARED IN
SAVANNAH, GEORGIA, IN 1876.

BY
OCTAVIUS* A. WHITE, A. M., M. D.

[REPRINTED FROM THE NEW YORK MEDICAL JOURNAL, MARCH, 1877.]



NEW YORK:
D. APPLETON & COMPANY,
549 & 551 BROADWAY.
1877.

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MAP OF CITY OF SAVANNAH AND SUBURBS.



a, b, Cleary and Lynch cases, August 21st, 22d; *c*, Laura Smith, August 26th; *d*, E. S. Drummond, August 29th; *f*, Mary E. Malcome, August 29th; *g*, Planters' Hotel.
A, Mouth of Canal; B, Foot-bridge; C, Railroad Bridge; D, Mouth of Sewer; E, Water-Works; F, New Canal.

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REPORT UPON YELLOW FEVER AS IT APPEARED IN SAVANNAH, GEORGIA, IN 1876.¹

EPIDEMICS are Nature's protests against the violation of her sanitary laws. Their causes may not in every instance be promptly recognized, but time and experience will surely reveal them.

The records of the past are filled with proofs of the misery entailed by neglect of quarantine and other sanitary institutions. An uncertainty as to whether many of the most formidable impressions precipitated upon mankind are of endemic or exotic origin affords commercial greed a chance too often exercised to determine the issue in its own behalf, ignoring the fact that gain in trade can never recompense for loss in population.

Studied by the light of modern sanitary science, every pestilence which has decimated humanity during the lapse of centuries has impressed its bitter and unmistakable lesson for the benefit of our own and that of generations yet to come. The institution, therefore, of public and private hygiene becomes the paramount duty of civilized man whom necessity compels to concentrate into communities.

¹ Read at a Stated Meeting of the New York Academy of Medicine, December 21, 1876.

It is sad, indeed, to reflect that the revelations necessary for the preservation of the human race should be acquired only through suffering and sacrifice of hecatombs of victims.

The portability of yellow-fever germs or atoms has never yet been disproved, and the hope of forever shutting this pestilence out of our ports by a rigid system of quarantine is with reason entertained.

There has been a period in our medical history when yellow fever was regarded as an endemic of this continent, and its annual appearance somewhere on the coast looked for with dreaded certainty. Experience, however, has proved that those cities extremely liable to its invasion have, by a rigid enforcement of quarantine laws, enjoyed long and happy immunity.

Savannah, surrounded by local influences sufficient at any time, during summer, to hatch into activity the specific germs of yellow fever, if indigenous, has often escaped a visitation of this pestilence, while it raged with unabated fury in a near sister city.

Some medical authorities, ignoring the question of importation of this disease, have located Savannah and other cities, even northward, within a so-called *yellow-fever zone*. A critical review, however, of the health record of this city attests to the fact that no other urban locality on the broad Atlantic coast enjoys a superior reputation for general salubrity.

During an uninterrupted interval of twenty-six years, between the years 1829 and 1854, Savannah was completely exempt from visitation of yellow fever. Nor did her table of vital statistics in the mean time exhibit any remarkable increase in the rate of mortality from other causes.

Compared, therefore, with other cities on this coast, considering her commercial importance, and especially in view of her late calamity, Savannah to-day presents an insoluble puzzle to skeptics in the exotic origin of yellow fever in this country. I am willing to admit that Savannah, Charleston, and other cities upon our coast, lying within a latitude liable to high ranges of temperature during three months of the

year, are within a zone favorable to the proliferation and dissemination of essential epidemic germs after being transported thither; but I cannot concede, with the light of experience before me, that these cities are within the zone capable of generating independently and anew the specific poison upon which such an epidemic depends.

It seems impossible to find yellow fever disassociated from intense heat, superabundant moisture, and general filth. These are the conditions peculiarly favorable upon our coast for its reception and diffusion. The more intimately the facts become known relative to the source and spread of yellow fever in Savannah during the past season of 1876, the more firmly will the doctrine of its exotic origin become established.

An honest investigation of the rise and progress of this epidemic, so far as its specific element is concerned, will, I feel confident, superadd another to the host of proofs already offered, that yellow fever has never presented itself upon this continent without recent introduction of the germinal principle from a foreign source universally acknowledged to be its familiar habitat.

The germs of specific yellow fever I believe to be always imported. The history of no epidemic of this character seems ever complete, in this country, without the inevitable mention of a ship from an infected port.

Such astonishing statements continue to be affirmed respecting the velocity with which this disease disseminates itself, especially among shipping at anchorage, that the medical mind is yet undetermined both as to the relative speed with which the *materies morbi* can diffuse, and as to the maximum distance at which their baneful influence can be aërodynamically transmitted.

Shortly after I arrived at Savannah, I learned that, on or about the 29th day of July, a seaman named Schull had sickened on board the schooner T. H. Sever, which had been discharging a cargo of ice recently arrived from New York, and was taken to the Marine Hospital in Savannah, where he died after presenting *peculiar symptoms*. This schooner I was assured had laid at the identical wharf, about four hundred and fifty feet apart from two West-Indiamen, the bark Nueva

Ygnacia and the brig Ynez—one twelve days from Matanzas, the other thirteen days from Havana.

Dr. George H. Stone, assistant surgeon in the Marine Hospital service, under whose care this man fell late in his attack, has stated that Schull died on the 30th day of July, with a sudden and overwhelming gush of hæmorrhage from the mouth while sitting up calmly and cheerfully in bed. No particular alarm seemed to have been excited by this case, nor did announcements of subsequent suspicious deaths which took place after this date, up to the 21st day of August, occasion any special uneasiness.

The death-list, carefully compiled and published in the *Savannah Morning News* of November 28th, specifies two deaths as having occurred on the 6th day of August, one of *chronic enteritis*, the other of *congestive fever*. A girl died of *malarial fever* on the 14th day of August. A boy succumbed with *pernicious fever* on the 16th of the same month, and on the same day a woman died of *remittent fever*.

The two Spanish ships above named discharged their cargoes at the Atlantic & Gulf Railroad Wharf, consisting of about one hundred and fifty tons of ballast, between the 14th and 17th days of July, the seamen being permitted to take their several mattresses and blankets to a lodging-house within the city.

On the 17th day of July the Spanish bark Maria, twenty-three days from Havana, arrived at this wharf, and discharged her cargo of one hundred and forty tons of ballast, and departed.

On the 2d day of August the Spanish brig Pepe, seventeen days from Havana, arrived at the same wharf and discharged a similar cargo.

On the 17th day of August the Spanish bark Maria Carlina arrived at the same wharf, twenty-three days from Havana, and relieved herself of two hundred tons of ballast, which was duly deposited upon this identical wharf.

The first recognized and publicly admitted case of yellow fever originated precisely where we would expect to find it, viz., among that class whose habits and rank in life render them peculiarly liable to pestilential agents. This happened

in the person of a boy by the name of Cleary, who died at his humble dwelling in the extreme northeastern section of the city, the nearest inhabited point in a direct line from the Atlantic & Gulf Railroad Wharf, in the immediate vicinity of the Gas-Works, within a stone's-throw of the river-bank, about eight hundred and fifty feet from the habitual haunt of *all* the Spanish seamen who frequent the port, and even within the identical street, about two blocks distant.

The Cleary boys and the children of the mistress of this lodging-house were constant companions, and were often seen playing together about the wharf so memorable in this history.

The day after the death of the Cleary boy, a child named Lynch, living a few doors off, and within the same block, died also of admitted yellow fever.

The next victim in order was Laura Smith, who occupied a house just back of the Clearys', and who died August 26th. Drummond's death and that of Mary Malcome succeeded on the 29th day of August. The latter of these two cases, it is true, occurred far over in the western part of the city, but direct transportation thither can be clearly traced, besides which the occurrence of cases at such wide distances apart after introduction into a city of yellow-fever poison may readily be accounted for by the unrestricted perambulation of straggling crews, or by diffusion of fomites through infected clothing and bedding.

It is wholly unnecessary to pursue this connected recital of cases any further, since the disease became soon so general that Dr. Duncan, of Savannah, informed me he had computed forty-six deaths from yellow fever alone from August 21st, the date of Cleary's case, to September 1st.

Savannah is situated upon a sandy plateau, on the southern bank of the river of the same name. The site of the city is eighteen miles from the mouth of this turbid river, in latitude $32^{\circ} 5'$ north, is surrounded on every side by vast lowlands which require unremitting attention to prevent them from lapsing into septic sources of miasmatic emanations.

The city faces north and toward the river. The ground upon which it is built is so nearly a level plain that the drain-

age of much of the city is necessarily defective, and a great deal of rain is compelled to pass off by evaporation and absorption.

Surfaces that are prompt to imbibe moisture, in such latitudes, cannot fail to be also exceedingly ready, under the influence of torrid suns, to exhale insalubrious vapors. The original investigations of Dr. Fergusson, so lucidly detailed in the ninth volume of the Edinburgh "Transactions," respecting the febriferous activity of porous soils under solar desiccation, has placed this once doubtful question quite beyond the reach of cavil, and in consequence far less confidence than formerly is reposed in the health of such geological formations.

Even with the pelagic record, therefore, of this epidemic so clearly defined, the terrene history, however briefly and partially it may be told, must prove vastly suggestive to those interested in problems of public hygiene.

During the early spring and part of the summer of 1876 all the aërial, terrestrial, and meteorological conditions known to be favorable to the development of miasmatic diseases, were active in and about the suburbs of Savannah to an extraordinary degree.

According to the statement of the Signal-Office Bureau, the monthly mean of the thermometer for June was 80.56° . The rainfall was 18.80, and the total number of clear days was but fourteen.

The monthly mean of the thermometer for July was 84.5° , and the rainfall was 6.11.

The direction of the prevailing winds for both of these months was southwest.

There was no abatement of heat during the month of August, the monthly mean of the thermometer being 84.1° , and the rainfall 6.88.

In compliance with my request, Mr. Sinnott, the acting observing officer, *vice* Mr. Garrard, of the United States Signal Service, deceased, computed the number of calms during the month of August, estimating all observations under four miles per hour. The result was found to be—morning, 23; midnight, 26.

The wind prevailed chiefly from the south during this month, and during the two previous months from the southwest, over an undoubtedly miasmatic region.

The past summer was remarkable for extraordinary ranges of temperature all over the United States. Physical peculiarities and season, therefore, singularly favored the proliferation and diffusion of miasmatic germs, and the continued calms by night and day promoted their accumulation and concentration.

It is generally conceded that the form of a yellow-fever epidemic is determined by constitution of the atmosphere, by electricity, heat, humidity, and by prevailing winds, and its character intensified by pernicious gases which exhale from paludal sources, unsanitary sewers, privy-vaults, stables, vacheries, and middens.

In order, therefore, fully to appreciate the character of this disease which so speedily became *pandemic* in its far and wide-spread comprehension, it is proper to take a rapid survey of the immediate surroundings of Savannah, and particularly of the intramural condition during the past season.

Driving through the streets of this charming "Forest City," nothing inimical to health presented itself. Flourishing trees lined the streets on either side with grateful shade; and the umbrageous and grassy parks at nearly every alternate corner, the commodious residences placed at eligible intervals apart, with here and there tasteful private gardens, exuberant in foliage and resplendent in tropical glory, charmed the eye with views of health, comfort, and refinement. But it was manifest, upon inspection, that numerous surcharged privy-vaults throughout the city nightly exhaled noisome gases, tainting the air with toxic exhalations. Festering "dry wells," those recipients of human excreta, illimitable in septic capacity, acted like huge retorts, with beaks turned inward to habitations, belching forth, under the influence of blazing suns and pressure of rising ground-water, inexhaustible quantities of mephitic vapor.

In immediate proximity to the city limits were the dumping-grounds of the city scavengers, acknowledged cradles of pestilence, and the Bilbo Canal, with its foul and sedgy tribu-

tary ditches—all open conduits leading from city sewers—teemed alike with putrefying refuse and human ordure in their slimy and obstructed beds.

The wide-stretching *Netherlands*, so peculiar to Savannah, had been exposed, by neglect, to frequent overflows and saturation. Heavy rainfalls occurred upon these early in the season, followed by protracted and excessive heat, which started into active decomposition and extrication the dangerous hydrogen compounds, resulting from animal and vegetable decay, abounding in these localities.

About three-quarters of a mile distant from the eastern quarter of the city, in a direct line, lies, stretched-out, the Atlantic & Gulf Railroad Wharf, receiving from the Antilles constant relays of pernicious soil.

Three days after I reached Savannah I visited and examined this locality with Colonel Screven, and denounced the suicidal economy which dictated the construction of a wharf, in a southern climate, of contaminated material imported from the pest-bound coast of Cuba.

I have ascertained, from reliable authority, that over two thousand tons of blue clay, from the neighborhood of Havana, had been spread broadcast on this wharf from the holds of West-Indiamen during the past year, and that the only white man who handled this ballast was duly taken sick with yellow fever, but the negro laborers escaped.

Into such congenial soil and atmosphere the fatal germ of yellow fever was sown; and, alas, how melancholy a harvest was gathered! Such a combination of causes could not fail to create an epidemic, which must prove alike inimical to every class and condition of human life, the continuance of which depended only upon the fertility of the soil and other concomitant favorable circumstances.

This epidemic, therefore, it will be understood, was the combined product of three factors—*ochlesis*, *koïno-miasm*, and the specific germinal principle of yellow fever. This latter component element imparted to the other active epidemic causes its peculiar and specific malignancy. Differing, therefore, in certain essential particulars from every other epidemic of yellow fever I had before witnessed, it de-

manded special modification in respect of treatment, which I proceeded without delay to initiate. Familiar with every phase of yellow fever, having combated it through so many seasons, I soon realized that I had enlisted against an epidemic of peculiar character. Careful examination of numerous cases in various stages, aided by the acumen and painfully-earned experience of my distinguished friend Prof. J. G. Thomas, of Savannah, enabled me thus promptly and fully to appreciate the type of the malady, and to decide upon the plan of treatment suitable to the emergency.

Surrounded by such influences, I felt thoroughly convinced that no charmed circle of acclimation could exist; that all supposed barriers were overthrown; and that all within the limit of this *pandemic* were alike exposed to dangers.

The native blacks of Savannah and Charleston, S. C., fell victims to this disease. Certain individuals, who had been ill early in the season, endured a second attack, which, in some instances, proved fatal. The very afternoon of my arrival in Savannah, I saw in consultation a patient hopelessly advanced in this disease, who, up to the moment of seizure, felt assured of immunity, having had, a few years previously, yellow fever in Havana. Such instances, however, are rare, but by no means without precedent. One of the earliest cases which occurred in Charleston, in 1858, was that of an individual who recovered from yellow fever after having had black-vomit, and hæmorrhage from the gums, in 1854. But by far the most unique case on record is that of an old lady eighty-two years of age, who had never left the city of Charleston, and died in the summer of 1854, under my care, of a genuine, well-marked attack of yellow fever, with black-vomit and orange-hued skin.

The *pandemic* was at its height when I arrived in Savannah. Two hundred and six deaths had just occurred in the city from all causes within a period of six days, and forty more were reported to have died on the same day. I found the weather excessively dry, sultry, and non-ozonic, and the mean temperature ranged over 80°.

According to the census taken by the police force near the

close of the epidemic, the entire population was computed at 18,967. Of this number 11,614 were colored, and 7,353 white inhabitants. It was also estimated that about 1,000 whites were in the habit of quitting the city every night, and were not, therefore, subjected to the same amount of exposure.

Between August 1st and November 26th, 1,574 individuals died from all causes; and though in the list of deaths published in the columns of the *Savannah Morning News*, Tuesday, November 28th, other fatal causes than yellow fever are assigned in numerous instances, no competent observer can fail to detect the manifest errors committed in diagnosis and nomenclature.

When we consider that by far the largest portion of the population of Savannah who remained during the prevalence of the epidemic were colored, and who, as a class, are ordinarily exempt from danger, among whom, moreover, this disease usually appears in a mild form, the percentage of deaths strikes us with profound amazement.

The general character of the epidemic reminded me so forcibly of that form of disease described by Jackson, Alison, and Moseley, and since lucidly dwelt upon by Aitken, under the title of "Malarious Yellow Fever," that I forthwith called the attention of my friend Prof. Thomas and other leading practitioners in Savannah to the close identity.

"Malarious or paludal yellow fever," remarks Aitken, "seems to prevail for the most part in towns situated on the sea or river coasts of alluvial countries, in warm climates, and that while the banks of these rivers are liable to occasional alternate periods of inundation and drying up, the fluctuations of the tides, coöperating with these, contribute powerfully, under intense solar heat and a windless atmosphere, to render the towns along the shores of such districts the seat of this disease.

"When a remittent fever, or other paludal or littoral fever, has, under certain concurrent circumstances of weather, season, and physical peculiarities, made its appearance in any locality, it necessarily attacks all those who are, by constitution, habit, and age, susceptible and predisposed, and the majority of these it destroys."

"While ague is the offspring of the marsh or its margins," writes Dr. Craigie, "and remittent is the effect of a more concentrated form of the same exhalation from some moist surface in the process of solar desiccation, the malarious form of yellow fever appears to be the product of that state of the atmosphere which takes place after long continuance of solar heat, with little or no wind, in those points chiefly where the atmosphere of the sea and that of the land are in constant communication and interchange.

"It is indeed a remarkable fact that the intense form of remittent fever, which has been distinguished as malarious yellow fever, and sometimes as bilious remittent of malignant type, is rather rare in the interior of countries, and is seldom found in towns situated on rivers higher than the influx of the tide. The fevers which appear in these situations are more of the usual remittent character, and in the interior of the American Continent there is little doubt that the lake-fever represents the malarious yellow fever of the coasts. Even in Europe, while the towns on the sea-coast and on rivers were laboring under the malarious yellow fever, the sickness in the interior approached more to that of the remittent, or remittent continuous, type."

The character of the fever which came under the critical observation of Lamprière in Jamaica, it will be remembered, was distinctly described by him as "a variety of yellow fever, grafted upon a remittent;" and though the lamented Blair, in his "Essay upon the Epidemics met with in British Guiana," contended that the disease he noticed was "specific and *sui generis*," he was forced to admit "the intermittent malarial fever is so powerful here that the yellow-fever epidemic could not supersede it," and he still further testifies that this influence "in many modified the succession of symptoms."

An epidemic of a similar nature, however, to that which prevailed last summer in Savannah, with such destructive effect, is not without precedent in this country. The posted student of the literature of this subject cannot fail to recall the detailed experience of Dr. Lewis, of Alabama, in the hybrid epidemic, which he describes as having appeared, in

1842, in Mobile. In that epidemic quite a number of cases were distinguished, marked by evident blending together of malarial with specific yellow-fever poison, as "congestive, simulating yellow fever;" and M. Thomas, in his very interesting "*Traité sur la Fièvre Jaune observée à New-Orléans*," also affirms he had detected "a remittent pyrexia" in several instances among the hosts of cases he so critically passed in review.

At the meeting held in the year 1873 by the American Public Health Association, a brief paper was submitted by Dr. J. T. Gilmore, of Mobile, Ala., recording a succinct "Account of the Yellow Fever as it prevailed in Mobile and Vicinity in the Summer of that Year."

Upon the 393d page of the published "Transactions" referred to can be found the following testimony of Dr. Gilmore: "In localities where malaria exists, we have malarial fevers, and, when the poison of any fever is introduced, this atmospheric condition gives it lodgment and propagation. And I believe that the fever we have seen as existing here this season, and in 1867 and 1870, was this fever, with more or less of the specific yellow-fever element incorporated with and engrafted upon it, and the presence of these two distinct forms of fever explains to my mind the oftentime-heard expression, that every epidemic of yellow fever exhibits different features from the preceding. This paludal or littoral form of fever is a disease of low mortality, and the real or specific yellow fever is a disease of almost unequalled fatality."

The development of this disease is, without doubt, dependent upon the endemic conditions peculiar to those localities lying between 42° north latitude and 10° south latitude, and is, therefore, not likely to be detected beyond this geographical belt. The resemblance between the specific yellow fever and its less malignant congener, even when unmixed, is acknowledged by all observers to be remarkably close, and diagnosis is at all times exceedingly difficult, though distinction can be invariably made out by an expert.

It is an important fact that, upon the announcement of this epidemic, quite a large number of residents rushed into the healthy sections of the adjacent country. From these safe

and accessible retreats, many, throughout the season, continued to revisit the city daily, to transact business, scrupulously shunning the danger of being caught within the zymotic precincts after sundown, and, taking no other special precaution, these parties are said to have escaped the scourge.

As is invariably the case, during the prevalence of such epidemic cause, every other disease became subordinate to it, and the most trifling indisposition paid homage to the dominant presence, and wore its livery.

Radiating from palpable causes, the infectious character of this epidemic was clearly established. The specific element extended throughout the city only so rapidly as the *materies morbi* could diffuse itself, and appeared to fix with great tenacity upon certain localities in which "crowd-poison" appeared to be a supreme ingredient. An old hotel on the south side of Broughton Street continued throughout the epidemic to furnish most malignant cases.

Originating from the three causes I have specified, this disease, in its mode of invasion, very naturally, differed in certain respects from those commonly described in less mixed epidemics. The accession was rarely sudden and without premonition. Individuals were often notified of the imminence of an attack by one or more of the ordinary prodromata. Yellowness of the conjunctivæ, ocular spectra, giddiness, loss of appetite, tendency to sweat upon slight exertion, and flatulence, being the commonest premonitory signs.

Purely malarious fevers never make their invasion during the night, and I noticed in this, as in previous epidemics, that the small hours of the day and night, particularly the latter, seemed selected as the periods of onset. Patients were commonly aroused from midnight slumber to face an attack of this fever, and these cases, as a rule, presented the most threatening head-symptoms.

Every case began with a chill, more or less pronounced, some started with a decided and enduring cold fit, others with an indefinite sense of horripilation. A scorching fever immediately succeeded to these sensations, bearing no harmonious relation to the antecedent chill. All alike presented the

grave and formidable initial symptoms of an open attack of yellow fever.

The stomach, generally the first to sympathize, was thrown into distress, with nausea and sometimes vomiting. The suffering in the head, commonly limited to the brows, was often referred in the direction of the longitudinal sinus. Restlessness and insomnia were constant throughout the febrile paroxysm. Few cases presented delirium, though the countenance of each wore a puzzled or dejected aspect. The face was flushed and turgid; the eyes watery, heavy, and injected, often intolerant of light and tender to the touch; the respiration was hurried, often interrupted by sighs; epistaxis would sometimes occur, to the great temporary relief of these symptoms, but the progress of the case invariably showed that this loss of vital fluid was illy borne.

Of all the torturing symptoms the wretched patient was called upon to endure, spinal aching was the most intolerable; it was wailingly bemoaned, and caused ceaseless and uncontrollable jactitations until relieved.

All the early symptoms appeared to result from a state of venous repletion. This peculiar condition set in speedily, formed a characteristic and enduring complication throughout every stage, quite up to restoration, accounted for many of the dangerous determinations which persistently threatened, retarded convalescence, and ushered in the fatal close.

The tongue during the early stage was commonly moist, pale, trembling, swollen, indented. The imminence of gastric disquietude was presaged not so often by preternatural redness about the tips or edges, with coating, as by a marked tendency to dryness, with pallor.

The efflorescence about the surface of the face, neck, and back, noted first by Hildebrand, subsequently by La Roche, by Barton, of New Orleans, and which I myself have often witnessed in other seasons, though carefully searched for, was not apparent during this epidemic.

No case during any stage of this disease, or even after death, presented the noted and characteristic deep-orange hue of the skin, as seen in some unmixed grades of this disease.

The skin, dry, harsh, and hot, appeared singularly insus-

ceptive, and would often for a long time resist the effect of croton-oil or blisters.

When black-vomit did occur this season, it was invariably after subsidence of the fever, and during the period of calm. In most of the epidemics that I have seen, this dreaded symptom has usually manifested itself early on the decline of the first stage.

A young mulatto girl, whom I was called in to attend during the second day of her attack, and who presented an exceedingly irritable stomach, was the only case in which I witnessed the peculiar azure-colored vomit, noted so repeatedly in other epidemics. This manifestation has been plausibly explained as due to excess in the stomach of free hydrochloric acid, which has combined in certain proportions with vitiated bile and saliva.

A most remarkable symptom, and one to which attention has never before been called, presented itself during this epidemic—that of total blindness, with dilatation of the pupils. This occurred in but two notable cases, so far as I have at present learned. One of these fell under my own immediate observation, in consultation with Prof. Thomas. The patient was a young son of William Inglis, a well-known and highly-esteemed colored barber, formerly of Charleston. This boy's case came on with the usual train of symptoms, his headache confined to the frontal region, and not being particularly urgent. Everything progressed naturally until the end of the second day, when he was suddenly stricken with amaurosis, the pupils being greatly dilated. His other senses and strength appeared remarkably good, and his spirits not depressed. This condition lasted four days; at the expiration of which period he began gradually to distinguish light, and by the time he was able to sit up, about five days after, his eyesight was completely restored.

The second instance in which this extraordinary symptom appeared was in the person of the lamented Dr. Juriah Harris. This esteemed physician of Savannah fell a victim to the pestilence on the 7th day of November, having been, in like manner, struck blind, with dilated pupils, twenty-four hours before the close of his valuable career.

The pulse was rarely as frequent from the commencement of attack as the state of the respiration or temperature might warrant. Within one hour after reaction from the chill, the thermometer often registered a body heat of 102° or 104° . The thermometric examinations taken regularly at each visit yielded interesting results. To gain a speedy and accurate observation, the instrument was invariably applied under the tongue or within the rectum. The same usual want of correlation between the range of the temperature and pulse, that I had noticed in previous epidemics of yellow fever, was strikingly repeated during this season.

The pulse and the heat of the skin, as noticed by crude touch, would commonly indicate entire subsidence of the febrile paroxysm within about twenty-four or thirty-six hours, when the unerring thermometer would still continue, throughout the delusive calm, to display a cautionary signal of danger.

The pulse, surface of the skin, and other symptoms would often appear to indicate complete defervescence of fever, when the thermometer would render apparent that the fit was at its height.

In the event of any dangerous complication arising, the thermometer would rise suddenly and rapidly. In two cases which I witnessed the thermometer indicated as high as $107\frac{2}{3}^{\circ}$. The pulse, meantime, in both, rated not over 100, moderately soft, and with only a nervous thrill.

The thermometer, therefore, proved, as ever, a most trustworthy and indispensable auxiliary, affording always the first intimations of approaching danger or convalescence. Indeed, the appalling horror of a "walking case," which strikes terror in the course of such epidemics, can be forever placed beyond contingency by frequent reference to the reliable revelations of this most refined and sensitive "instrument of precision."

According to the thermometer, the duration of the first or febrile stage never exceeded four days, but three days appeared the limit in by far the largest number of cases. The second stage rarely lasted over twelve hours.

Patients ordinarily glided so insensibly through the sec-

ond stage into convalescence, under the masterful influence of the treatment, that it was only by aid of the thermometer that the line of demarkation could be ascertained.

The mixed character of this epidemic seemed definitely indicated by the following facts:

1. By the prompt submission of the disease to positive doses of quinine.

2. By the remarkable death-rate among the blacks.

3. By the large fatality attending cases which occurred among supposed inured natives and other inhabitants, who, from acquired acclimation, do ordinarily escape infection from yellow-fever poison alone.

4. By the unusually great percentage of deaths which occurred among children under twelve years of age.

5. By the mitigation which ensued in the pythogenetic character of the pestilence after occurrence of sluicing rains, which served to wash out the sewers, about the middle of October.

6. By very decided abatement in the malarial element of the epidemic succeeding the appearance of light frosts around the immediate limits of the city near the close of the season.

It is manifest, therefore, from the facts thus broadly stated, that, even had no pelagic element been introduced into Savannah during the past season, this city could not have escaped endemic visitation of an intense and widespread typho-malarial character.

Remedies which have been employed with signal success in the course of one season, have proved utterly valueless, nay, even hurtful in another. This well accounts for the success which has attended various forms of treatment, the very reverse of each other in different epidemics.

No one familiar with yellow fever will ever continue to indulge the hope that a treatment can be devised which shall in every instance prove equally efficacious. Whoever, therefore, undertakes to erect upon the experience of a single epidemic a plan of treatment for yellow fever, which he expects to bear him on to success through every other, must be prepared to find his ingenious structure fail to sustain his expectations.

My first professional acquaintance with yellow fever began in Charleston, S. C., twenty-seven years ago; and while yet a tyro in practice, I learned, through successive seasons of hard-earned experience, that every particular epidemic presented a fresh problem to be evolved and successfully worked out.

During the yellow-fever visitations of 1849 and 1852, in Charleston, I was compelled to follow with content the well-beaten track of practice laid down by predecessors. Soon, however, dissatisfied with the results observed, and recognizing a difference in the type of each epidemic, I resolved, in 1854, to venture upon innovations. These eventuated so encouragingly that I was quite ready again, in the season of 1858, to boldly institute, in conjunction with my able friend Dr. William H. Ford, a *slow-beat* plan of treatment (therefore denominated by us *bradycrater*). The November number of the *Charleston Medical and Surgical Review* contains a full and succinct statement of the success which attended this first employment of *gelsemium sempervirens* and *veratrum viride*, pushed to the verge of tolerance, in yellow fever.

In the year 1862 I was commissioned to the relief of Wilmington, N. C., by the Confederate War-Office in Richmond. The plan of treatment which I found most successful during that disastrous epidemic was in many respects similar to the one I am now about to describe. My report, a brief official statement of the duty performed upon that occasion, was duly forwarded to headquarters, and is doubtless among the host of other official documents seized and carried to Washington at the close of the civil war.

It is of prime importance that the genius of each individual epidemic should be thoroughly mastered, in order to decide upon a plan of treatment which is likely to prove most appropriate.

The disease in Savannah, though inflammatory at the off-start, became typhoidal when under way, owing to the oehletic cause above specified, and therefore great care was necessary to exclude remedies which had the slightest spoliative or depressing tendency.

Aware, from so large an experience with this treacherous

malady, that it was absolutely impossible in the commencement to determine whether a case would prove mild or grave within twenty-four hours, I judged it most prudent to treat all alike with relentless energy. Every patient was, therefore, subjected to the same plan of treatment herein-after detailed, deviations being made with great caution to suit special exigencies arising from habit, constitution, or idiosyncrasy.

Though the general outline of treatment was so nearly identical, the progress of each case was found full of sudden and dangerous contingencies to the end. In order, therefore, to conduct a patient in safety through his attack, constant vigilance, skill, and therapeutic resource were called into requisition.

The treatment which I practised with such success during the epidemic in Savannah can be summed up in a few paragraphs.

Absolute rest in the horizontal position was enjoined, and patients strictly required never to rise from their pillows for any purpose, due arrangements being made to avoid violation of this injunction.

Strict abstinence throughout the first stage was ordered. Now and then a mouthful of foaming seltzer, freshly drawn from a siphon, was allowed. Pellets of ice were permitted without stint.

When seen early after seizure, a hot foot-bath, to which turpentine had been properly added, was administered, and cloths wrung out of ice-water applied to the head. The pediluvium was repeated as often, throughout the first stage, as the exigencies of the case demanded its employment.

The treatment was always commenced by the administration of a single powder, consisting of half a scruple each of calomel and supercarbonate of soda, with twenty grains of quinine. This combination never failed to bring away, within a reasonable time, one or two evacuations, bilious and moderately consistent in character.

In no instance did the bowels exhibit any tendency to hypercatharsis after this dose. The use of the syringe was

therefore often demanded throughout the subsequent management of the case.

The rate of the pulse was invariably diminished within from six to eight hours after the administration of this dose, though corresponding abatement of temperature did not as promptly ensue.

The very reluctant manner in which the temperature declined after this sudden reduction of the pulse was quite notable and characteristic. Instances of very protracted delay about this physiological manifestation were common; and, though the correlation remained at variance throughout the first stage, this did not appear to retard the progress of the case to final convalescence.

Frequent tepid spongings, practised over the entire body, so as to occasion no fatigue, materially reduced the parched condition of the skin, and proved most grateful.

The rachalgia, referred to as so torturing a symptom, always and promptly yielded to steady applications over the loins of flannels steeped in diluted whiskey and laudanum.

So soon as anguish in the back was allayed, croton-oil liniment was applied to excite the surface of the skin in its characteristic manner over the region of the kidneys, as I believe that these organs are gravely threatened from the commencement of the first stage of this fever.

Four hours after the administration of the first powder, ten grains more of quinine were placed dry upon the tongue with a pellet of ice; this dose was repeated every two hours thereafter during the persistence of the first stage.

The thermometer was used as the guide for continuing or abating the administration of quinine. As long as the temperature exhibited tendency to rise, or maintained a steady high rate, this medicine was persisted in, but, so soon as any decline in temperature was detected, the quantity of quinine was reduced one-half, and camphor, with a view to its diffusive stimulant and sudorific effect, was given in combination with it every four hours. This treatment was kept up until the thermometer indicated a normal temperature.

If the quantity of quinine was at any time reduced too

soon, the temperature and pulse would surely rise, and it was always singularly difficult to recover that lost rate.

The quinine did not seem to disturb the stomach, and, even when nausea supervened, unremitting administration of this "calmant and tranquillizer," as Drake has so well termed it, would alone pacify the viscus. This result I am disposed to attribute to the fact that this alkaloid is a basic compound, and therefore uses up the peculiar acid known to be so abundant in the stomach throughout this fever, and which proves not only a direct source of irritation, but largely enters into the composition of black-vomit.

In no instance have I ever noted any corroboration of the views of Mialhe regarding the purgative effect of large doses of quinine.

Briquet has long since shown, by a laborious series of experiments, that quinine possesses the power to lessen the heart's action, while it also tended to depurate the blood; and, if the testimony of Dr. Hinckel, expressed before the American Medical Association some years since, is superadded, that this remedial agent, in sufficient doses, calms the nervous system, increases the capillary action, and promotes eliminating processes, so desirable from the kidneys, then is its administration throughout the various stages of this disease theoretically demanded.

In no stage of this fever did any one of the ammonia compounds agree. The system seemed already surcharged with this alkali; an observation quite in accordance with the well-known statements of Reuling, who detected ammonia in the breath in cases of low fever and albuminuria.

The special treatment above detailed, when instituted early, always tended to shorten the first stage, and also very materially modified the severity, and absolutely abbreviated the succeeding stages.

In cases presenting hurried and oppressed breathing or sighing, the surface of the thorax was freely anointed with a liniment composed of croton-oil, chloroform, and spirits of turpentine, in proper proportions, and this was applied every three hours until an abundant efflorescence was secured.

Opium, in any of its various forms, was deemed dangerous

and never given until convalescence was fully established, and then in great moderation. Hyoscyamus, lupulin, lactucarium, cannabis Indica, or bromide of potassium, were the only hypnotics which could be exhibited with any degree of safety during the several *stadia* of this disease.

After the first stage, purgatives of no description were admissible, and laxatives only of the blandest nature, in the form of enema, were employed, until health was quite reestablished.

Blisters were very frequently required, and were resorted to with unfailing advantage. These were ordered in every instance promptly as soon as indicated, and were of no trifling dimensions. Mere redness of the tip or edges of the tongue with coating, unaccompanied by other symptoms, was not regarded as sufficient evidence of alarming gastric irritation; but the slightest tenderness on pressure over the epigastrium, or even eructation, after the first thirty-six hours, was looked upon as a definite cause for the immediate application of a blister over the entire abdomen. A neglect of this rule in the conduct of a case would surely place the life of a patient in jeopardy.

In case hæmorrhage threatened to take place from these surfaces during the subsequent progress of the case, it was controlled by proper dressings of fine tissue-paper, impregnated with styptics.

Stimulants were demanded early and throughout the progress of the case, and were essential during convalescence.

Every case entering upon the second stage which presented torpor of capillary circulation was put upon the use of turpentine in emulsion of gum-arabic with camphor, which acted most favorably.

With decided evidences of a decline about the pulse and temperature toward a healthy standard, nourishment was cautiously introduced. Thin chicken-broth or beef-tea was generally selected to begin with, and given by the small teaspoonful at stated intervals.

Milk invariably disagreed, even when combined with lime-water. All starchy compounds were forbidden, as they predisposed to flatulence. The stomach, even when acid, is usu-

ally devoid of gastric juice, and pepsin is found almost entirely absent.

Especial attention was paid throughout to the function of the kidneys. They caused but little anxiety comparatively—less than I have ever experienced in the course of similar epidemics. The urine, I noted, was frequently diminished in quantity about the third day, and, in two critical cases, suppression occasioned alarm by a persistence of over sixteen hours.

Among the very last cases I saw was one in consultation with my skillful friend Dr. Duncan, which presented, in the course of a dangerous attack of the fever, a remarkable character of urine. The patient was a young gentleman, native, in whom a protracted suppression was followed by discharges of highly-albuminous urine, which began a dark brown, became gradually black as pigment could make it, passed through different shades of ocean-green, and finally faded off into the natural hue, during a tardy convalescence. This case presented also black-vomit and soreness about the parotid glands.

I witnessed three deaths from sudden collapse, in consultation with other physicians. In such cases remedies proved of no avail whatever to supply or arouse vital force; the powers of life ebbed away apace, with the nerve-energy alone exalted under the influence of potent stimulants.

Black-vomit cases were rarely seen, and those exhibiting it recovered with the rest, though by no means so speedily.

Recuperation was materially aided by the administration of muriated tincture of iron and daily use of Scott's bath.

During the critical *stadium* when dreaded black-vomit is imminent, the most trivial circumstance has been known to precipitate a crisis, and the nauseating odors of a sick-chamber at such a juncture may prove the exciting cause of this appalling symptom. The stomach, which the immortal Rush so strongly characterized as "the throne of the disease," is always more or less unsettled during an attack of this direful malady, and, when finally upset, demands consummate skill to restore it to order.

There can be no doubt in the professional mind that cer-

tain chemical agents do possess the power to destroy the specific poison upon which zymotic diseases depend, and it is also highly probable that the fatal blow is struck at toxical influence, derived from ordure and other offensive material, when fetor, which is so overpowering an element about infection-carriers, is annihilated.

In consideration, therefore, of such views, and also that there yet prevails a doubt whether yellow fever, like cholera and typhoid fever, cannot be diffused by excreta from patients, the diligent employment of deodorizers and disinfectants about the persons and premises of cases under treatment should always be enforced, due precaution being taken to recommend the use of such chemical compounds only as tend to destroy odor without substituting another peculiar to itself.

In less than two weeks after the first recognized case of yellow fever, the disease had burst upon the terror-stricken community as a decimating scourge. So appalling was the mortality that the benevolent impulses of the nation were enlisted in behalf of this suffering city, and material aid of every kind flowed toward her in an uninterrupted stream. In rendering assistance, this great metropolis took the lead, and sustained her traditional character for generosity by munificent donations of money and supplies.

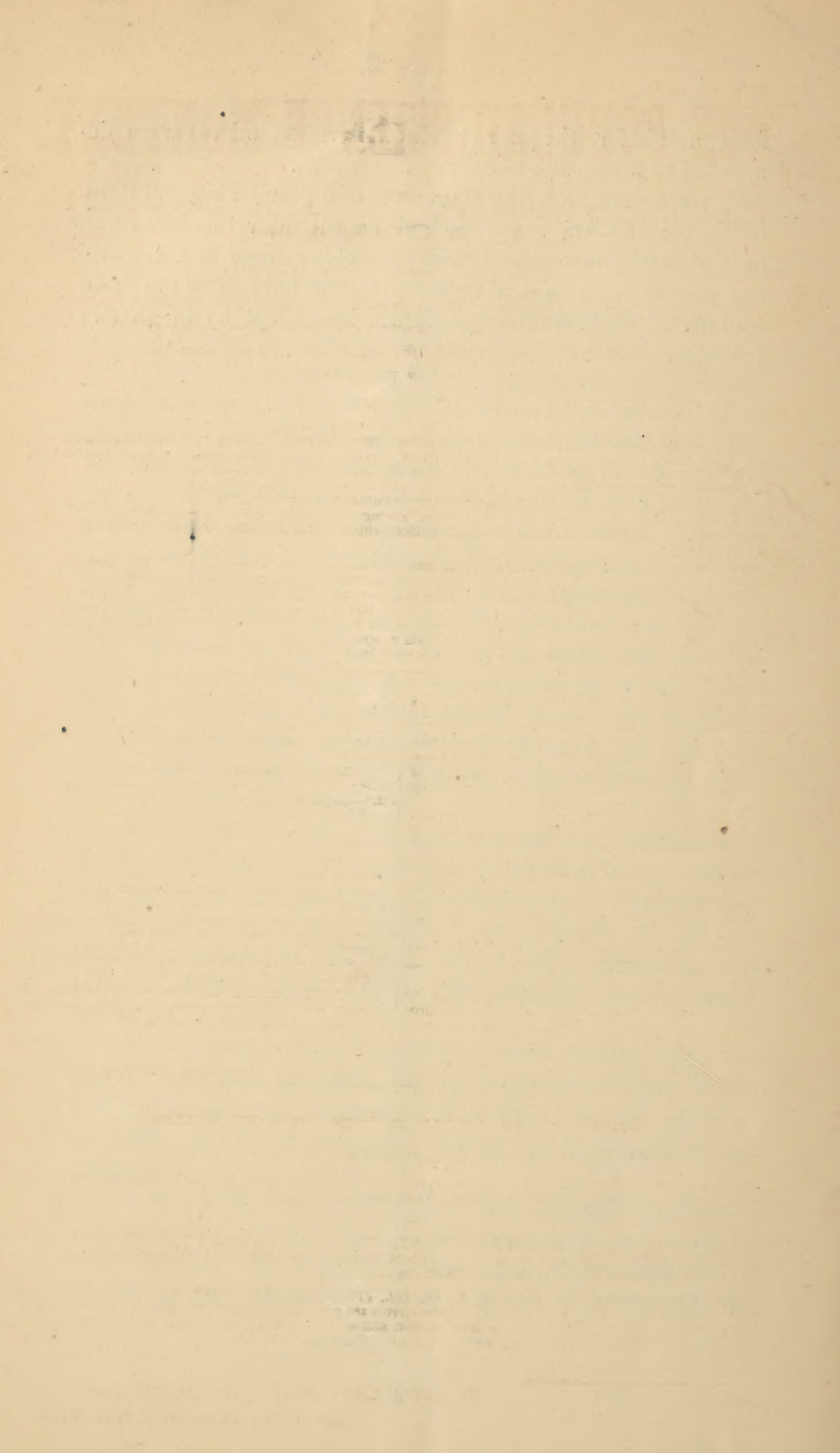
As soon as it became known, through our distinguished Fellow, Dr. Harris, that medical help was required to relieve the overburdened profession in Savannah, a meeting was promptly held by a large body of our profession at the hall of the Academy of Medicine, Dr. Purple presiding, and personal service from among their number was forthwith proffered.

In accordance, therefore, with a wish coming from the city of Savannah, acceded to by the profession of New York, I owe the honor and satisfaction of having rendered personal service to the city of Savannah during her recent calamitous visitation.

On the 14th day of November last, the great *pandemic* was declared at an end, but sporadic cases continued to occur in Savannah. The peculiar poison upon which the activity of this scourge depended seemed not yet to have spent its

force, and before the year closed other valuable lives were demanded to fill up the measure of its wrath.

Even as the lingering fragments of a plundering and desolating foe continue to ravage and despoil after the hosts and heat of battle have passed away, so do the dregs of this ruthless poison often snatch unwary victims long after the main column of the invading pestilence has swept by in ghastly triumph.



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